

Visual Testing with PyCharm and pytest

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Visual Testing with PyCharm and pytest

a lot of ground to cover

- TDD in 4 slides
- why pytest
- why PyCharm
- demo as much as we can
- have fun



(courtesy <http://moonlander.seb.ly/>)

TDD crash course

Design->Develop->Test

doesn't work

and ... it's not fun

Test -> Design & Develop

way more fun

includes do-overs

TDD - traditional

- Red: Write a failing test
- Green: Make it pass
- Refactor: Clean up your code

TDD according to Brian

- Red: Learn what it's like to use your code
- Green: Learn one way to implement the code
- Refactor: Make code you are proud of

(and don't forget to refactor your tests, too)

The cards project

something to test

for those of you following along at home

```
$ git clone -b pycon_2018 https://github.com/okken/cards.git
$ cd cards
$ python3.6 -m venv venv --prompt cards
$ source venv/bin/activate # venv\Scripts\activate (if
Windows)
(cards) $ pip install -r requirements_dev.txt
```

```
$ cards add -o okken "Prepare for PyCon talk"
$ cards add -o okken "Order stickers"
$ cards add -o okken "Order business cards"
$ cards add -o okken "pack"
$ cards update 2 --done True
$ cards update 3 --done True
$ cards list
```

ID	owner	done	summary
1	okken		Prepare for PyCon talk
2	okken	x	Order stickers
3	okken	x	Order business cards
4	okken		pack

cards

src

cards

__init__.py

cardsdb.py

cli.py

tests

api

__init__.py

conftest.py

test_tracer_bullets.py

....

cli

__init__.py

conftest.py

test_alac.py

pytest


```
(cards) $ pytest --cov=src
===== test session starts =====
tests/api/test_alac.py . [ 2%]
tests/api/test_list_filter.py ..... [ 50%]
tests/api/test_tracer_bullets.py ..... [ 67%]
tests/cli/test_alac.py . [ 70%]
tests/cli/test_list_format.py ..... [ 85%]
tests/cli/test_tracer_bullets.py ..... [100%]
----- coverage: -----
```

Name	Stmts	Miss	Branch	BrPart	Cover
src/cards/__init__.py	2	0	0	0	100%
src/cards/cardsdb.py	45	0	20	0	100%
src/cards/cli.py	58	0	14	0	100%
TOTAL:	105	0	34	0	100%

pytest allows you to run a subset of tests

```
$ # one directory  
$ pytest tests/cli
```

```
$ # one test module  
$ pytest tests/cli/test_tracer_bullets.py
```

```
$ # one test function  
$ pytest tests/cli/test_tracer_bullets.py::test_count
```

Some other ways to run a subset of tests

```
(cards) $ pytest --help
```

```
...
```

<code>-k EXPRESSION</code>	just tests matching this expression
<code>-m MARKEXP</code>	run tests w/ given mark expression
<code>-x, --exitfirst</code>	exit on first error/failed test
<code>--maxfail=num</code>	exit after first num failures/errors.
<code>--lf, --last-failed</code>	rerun failed tests from last run
<code>--ff, --failed-first</code>	same, but then run the rest
<code>--nf, --new-first</code>	run new test files, then the rest

More development speedups

- Fixtures: setup, teardown, resource and test data initialization, ...
- Parametrization: many test cases using the same test function
- Hooks and Plugins: the sky is the limit

CLI vs Visual Testing

```

(cards) $ pytest -x -v -k bullet --cov=src tests/cli
===== test session starts =====
platform darwin -- Python 3.7.0b3, pytest-3.5.1, py-1.5.3, pluggy-0.
6.0 -- /Users/okken/projects/cards/venv/bin/python3
cachedir: .pytest_cache
rootdir: /Users/okken/projects/cards, inifile: pytest.ini
plugins: cov-2.5.1
collected 13 items / 7 deselected

tests/cli/test_tracer_bullets.py::test_add PASSED [ 16%]
tests/cli/test_tracer_bullets.py::test_list PASSED [ 33%]
tests/cli/test_tracer_bullets.py::test_list_filter PASSED [ 50%]
tests/cli/test_tracer_bullets.py::test_count PASSED [ 66%]
tests/cli/test_tracer_bullets.py::test_update PASSED [ 83%]
tests/cli/test_tracer_bullets.py::test_delete PASSED [100%]

----- coverage: platform darwin, python 3.7.0-beta-3 -----
--
Name                               Stmts   Miss Branch BrPart  Cover
-----
src/cards/__init__.py               2        0      0      0    100%
src/cards/cardsdb.py               45        5     20      3     85%
src/cards/cli.py                    58        5     14      3     86%
-----
TOTAL                               105     10     34      6     86%

===== 6 passed, 7 deselected in 0.17 seconds =====
(cards) $ _

```

vs PyCharm

cards [~/projects/cards] - .../tests/cli/test_tracer_bullets.py [cards]

run configs / git control / ...

cards tests cli test_tracer_bullets.py

Project

- cards 92% files, 100% lines covered
 - src 100% files, 100% lines covered
 - cards 100% files, 100% lines covered
 - __init__.py 100% lines covered
 - cardsdb.py 100% lines covered
 - cli.py 100% lines covered
 - tests 100% files, 100% lines covered
 - api 100% files, 100% lines covered
 - __init__.py 100% lines covered
 - configtest.py 100% lines covered
 - test_alac.py 100% lines covered
 - test_list_format.py 100% lines covered
 - test_tracer_bullets.py 100% lines covered
 - cli 100% files, 100% lines covered
 - manual_tests.md
 - pytest.ini
 - requirements_dev.txt
 - setup.cfg
 - setup.py not covered
 - tox.ini

test_tracer_bullets.py

```
1 # -*- coding: utf-8 -*-
2
3 Tests using cards CLI (command line interface).
4 This file contains tracer bullet tests.
5 Not in depth tests of functionality.
6
7
8 import ...
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
```

test file editor

coverage results

gutter run control and breakpoints

Run: py.test in tests

Test Results

- tests
 - api
 - test_alac
 - test_list_format
 - test_tracer_bullets
 - cli
 - test_alac
 - test_list_format

visual results

results overview

Tests passed: 40 of 40 tests (100%)

api/test_alac.py [2%]

api/test_list_filter.py [50%]

api/test_tracer_bullets.py [67%]

cli/test_alac.py [83%]

cli/test_list_format.py [100%]

cli/test_tracer_bullets.py [100%]

pytest output

40 passed in 0.96 seconds

Process finished with exit code 0

built in REPL / terminal

Event Log

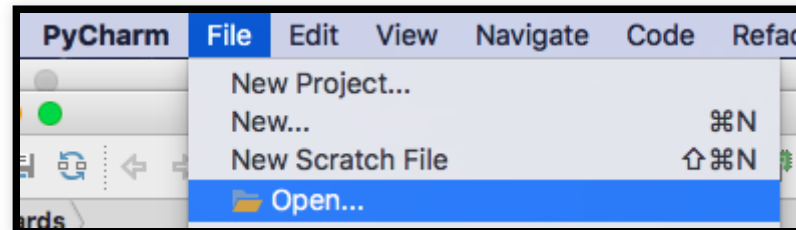
Tests passed: 40 (2 minutes ago)

12:1 LF: UTF-8 Git: pycon_2018

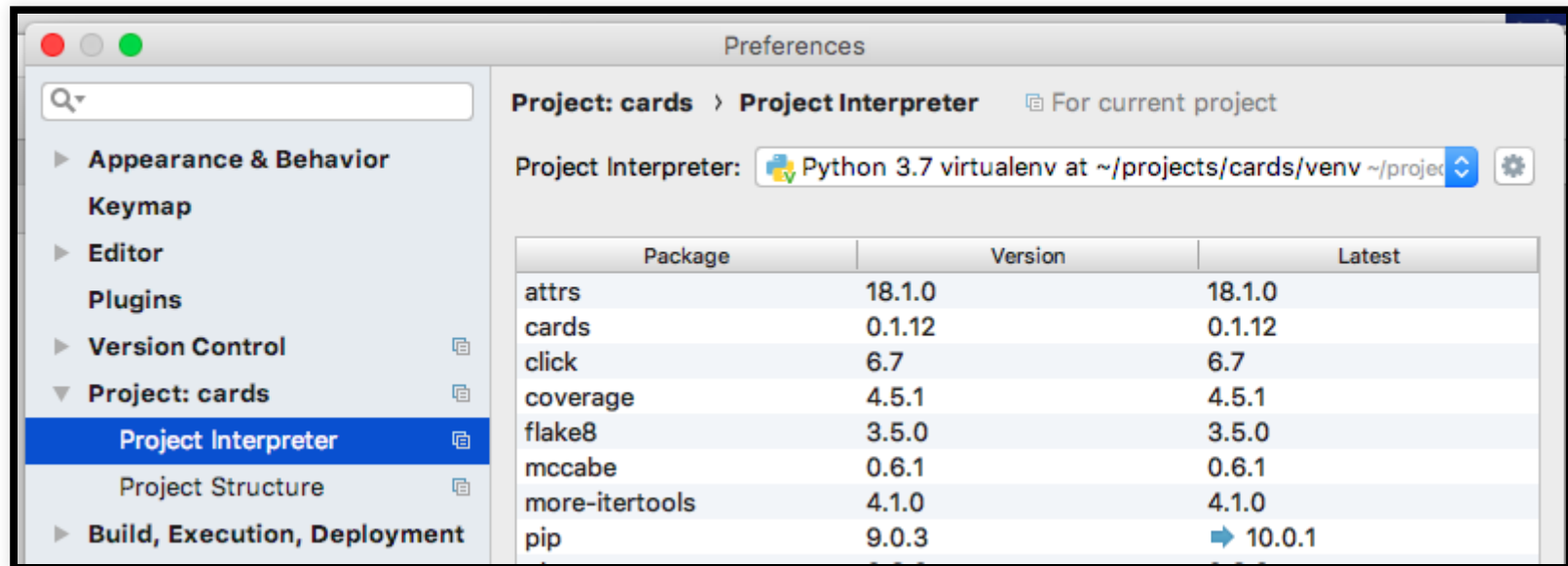
Some Setup

- PyCharm Community edition
- Use File->Open for existing projects
- Check the interpreter setting
- Check the default test runner

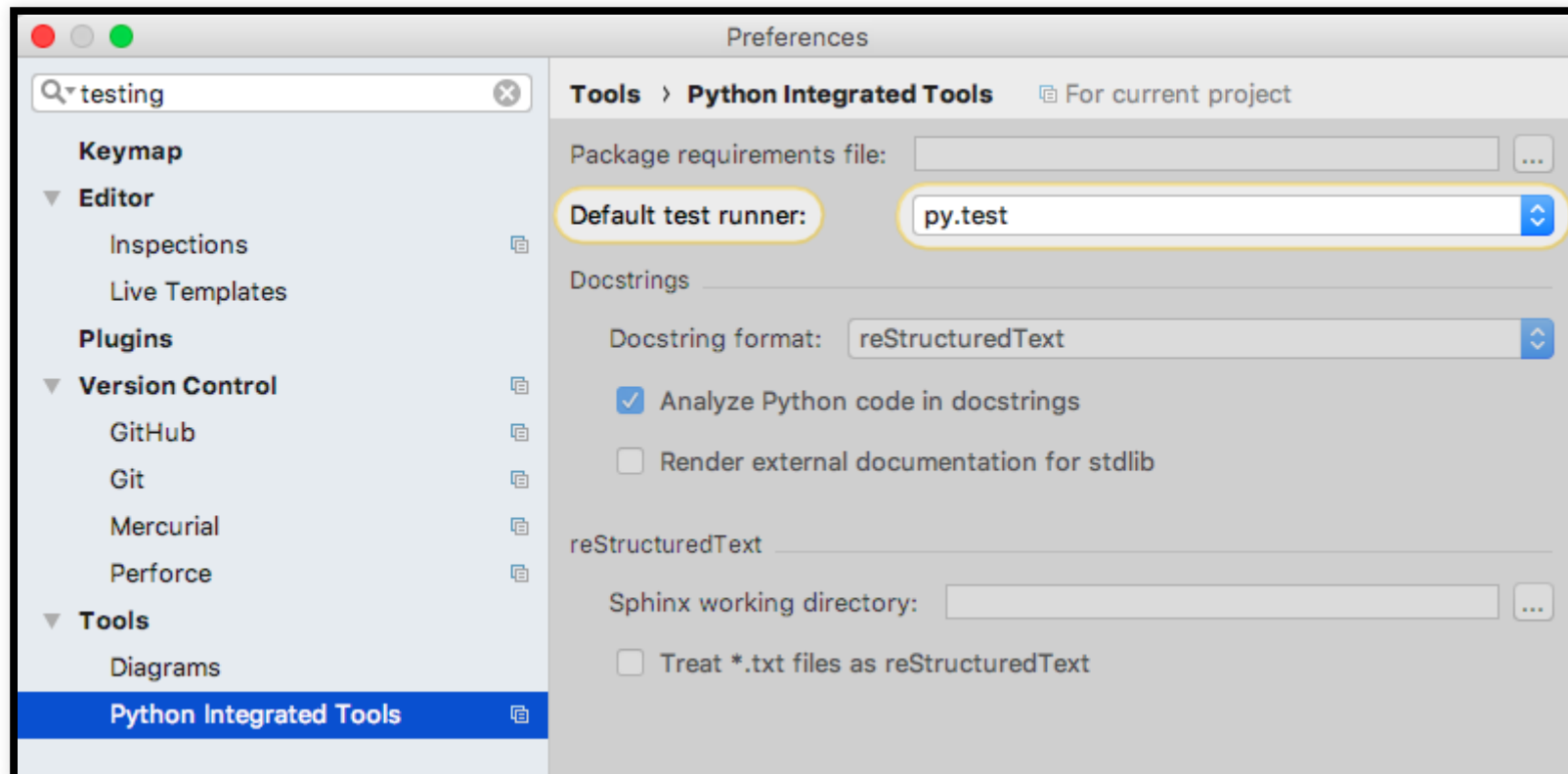
Use File->Open for existing projects



Check the interpreter setting



Check the default test runner



Demo

- run at different levels
- see test durations
- auto-running tests
- run only failing tests
- jump directly to the test failure
- see tests and code at the same time (TDD mode)
- debug tests and code together
- run REPL during a debug session

More info

- PyCharm: jetbrains.com/pycharm/
- Python Testing with pytest
 - pragprog.com/book/bopytest
- pytest
 - docs.pytest.org
 - stackoverflow.com/search?q=pytest
- Lessons about testing and TDD from Kent Beck
 - testandcode.com/23
- Twitter
 - [@brianokken](#), [@testpodcast](#), testandcode.com
 - [@paulweveritt](#), [@pycharm](#)